

Brookhaven National Laboratory National Synchrotron Light Source		Number: LS-SDL-0033	Revision: D
		Effective: 10/04/2005	Page 1 of 2
Subject: Laser Operator for the SDL Training Certification Checklist - Level I & II			
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[Revision Log](#)

Operator Level: ☐ I ☐ II **Operator Name:**

Completion of the items on this checklist and the signature of an authorized trainer will constitute the record of certification for an individual to be a qualified operator of the Laser System. There are two levels of Certification.

Level I is authorized to operate and run the laser under normal operation as long as a Level II operator is reachable on site to deal with more complicated operations or difficult operational problems. Level I laser operator is also authorized to use the SDL laser or FEL both inside the linac tunnel and end-station.

Level II is authorized to make optical adjustments to the laser system, the beam steering, and modify the electronics controlling the laser's synchronization with the accelerator.

Safety Requirements (Level I & II):

- ☐ Read appropriate safety documentation. This includes the material in the SBMS Laser subject area, and the SDL SBMS Laser Standard Operating Procedures (SOP). It also includes any information specific to a device the operator is working on (e.g safety sections of manuals to lasers, test, and diagnostic equipment). It is the operators' responsibility to learn the published safety procedures for any equipment he undertakes to use.
- ☐ Take required BNL eye examination
- ☐ Complete Laser Safety Awareness Training Course, Compressed Gas Course, and Basic Electrical Safety course.
- ☐ Eye protection required when entering laser hazard area.
- ☐ Understand the proper posting of the interlocked area, and how to operate the interlock and emergency stop buttons.

Requirements for qualified Level I & II Operator:

- ☐ Provide light to the SDL in the parameter ranges required
- ☐ Perform beam alignments into diagnostics and make measurements (not applicable to users)
- ☐ Insure that light is properly terminated.
- ☐ Shut down any part of the facility within their area of control that may present a safety hazard until that hazard has been removed.
- ☐ Understand procedures for starting/stopping beam; seed laser shutter control at control desk or in laser room; retractable mirror in the FEL output port that steers the beam to the diagnostics
- ☐ Understand that there are two beams coming out of the FEL; residual seed beam also reaches the diagnostic table. This is an invisible IR beam, which may be seen with an IR detector card or the IR viewer. **USERS SHOULD BE AWARE THAT THIS BEAM MAY BE PRESENT EVEN WHEN FEL OUTPUT IS NOT.** It may be blocked with the laser.
- ☐ Understand the principles of safe alignment (in the Standard Operating Procedure). In particular, users should note the proper use of flip-up mirrors, which are used on the diagnostic table. Before flipping a mirror in or out of the beam, block the beam upstream of the flipper first.
- ☐ Understand the basic beam path layout to the diagnostics (not applicable to users)

Requirements for Qualified Level II Operators:

A detailed description of the current system start-up and alignment procedures for basic operation is given in the SOP. Since the SDL is an experimental facility, the details of the SOP procedure may change. . The procedures listed here are effectively the present implementation of the tasks/skills listed below and the requirement of a level II laser operator

- ☐ Become familiar with laser interlock system. This is described in the SOP. Know location and operation of emergency shutdown buttons (two red buttons, one in the SE corner of the laser room, one above the telephone).
- ☐ Demonstrate the ability to align or adjust the alignment of all of the self-contained commercial lasers in the system (pump lasers and oscillator)
- ☐ Understand power-up and power-down sequences of the pump lasers.
- ☐ Understand all diagnostics readings, their normal states, and conditions.
- ☐ Demonstrate the ability to perform normal tune-up of the laser oscillator.
- ☐ Demonstrate the ability to verify the alignment of the seed laser through the amplifiers.
- ☐ Demonstrate the ability to safely power up the regenerative amplifier and multipass amplifier(s).
- ☐ Be knowledgeable of the operation of all of the chirped pulse amplification system, including the stretcher, the regenerative amplifier, the multipass amplifiers, and the compressor. It is required that the operator be capable of aligning or restoring the alignment of all components in each of these stages
- ☐ Demonstrate the ability to control the laser parameters that may need to be varied during normal laser operation, e.g. laser power, spot size, and timing adjustments.
- ☐ Demonstrate the ability to align and troubleshoot the frequency tripler.
- ☐ Be knowledgeable of the details of the optical beam transport to the photocathode.
- ☐ Be knowledgeable of the details of the electronics synchronizing the laser with the accelerator.
- ☐ Maintain Laser Operation Log.

Trained Operator:

(Printed Name)

(Signature)

(Date)

Authorized Trainer:

(Printed Name)

(Signature)

(Date)